PACSystems* RX3i

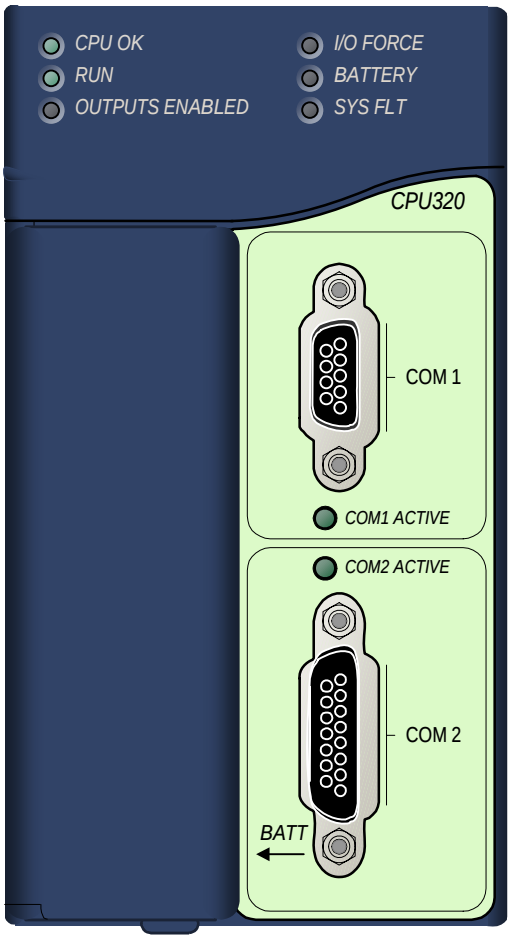
IC695CPU320

Central Processing Unit

GFK-2488K
July 2010

The PACSystems* RX3i CPU can be used to perform real time control of machines, processes, and material handling systems. The CPU communicates with the programmer and HMI devices via a serial port using SNP Slave protocol. It communicates with I/O and smart option modules over a dual backplane bus that provides:

- High-speed PCI backplane for fast throughput of new advanced I/O.
- Serial backplane for easy migration of existing Series 90-30 I/O.



Features

- Contains 64 Mbytes of battery-backed user memory and 64 Mbytes of non-volatile flash user memory.
- Provides access to bulk memory via reference table %W.
- Configurable data and program memory.
- Programming in Ladder Diagram, Structured Text, Function Block Diagram, and C.
- Supports auto-located Symbolic Variables that can use any amount of user memory.
- Reference table sizes include 32Kbits for discrete %I and %Q and up to 32Kwords each for analog %AI and %AQ.
- Supports most Series 90-30 modules and expansion racks. For a list of supported I/O, Communications, Motion, and Intelligent modules, see the *PACSystems RX3i System Manual,* GFK-2314.
- Supports up to 512 program blocks. Maximum size for a block is 128KB.
- In-system upgradeable firmware.
- Two serial ports: RS-485 and RS-232.
- Ethernet communications via the rack-based Ethernet Interface module (IC695ETM001). For details on Ethernet capabilities, refer to *TCP/IP Ethernet Communications for PACSystems User's Manual,* GFK-2224.
- Time synchronization to SNTP Time Server on Ethernet network when used with Ethernet Release 5.0 or later module.

Ordering Information

Description	Catalog Number
RX3i 1GHz Celeron M CPU	IC695CPU320
Auxiliary Battery Module	IC693ACC302
Standard Power Supplies 120/240VAC, 125VDC, 40W 24VDC, 40W	 IC695PSA040 IC695PSD040
Multifunctional Power Supplies 120/240 VAC, 125 VDC, 40W 24 VDC, 40 Watt	 IC695PSA140 IC695PSD140
[Optional] RS-232 Cable	IC200CBL001
Rx3i 12 Slot Universal Backplane	IC695CHS012
Rx3i 16 Slot Universal Backplane	IC695CHS016
Note: For Conformal Coat option, please consult the factory for price and availability.	

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CPU320 Specifications

Battery: Memory retention	Estimated 30 days using an IC693ACC302 Auxiliary Battery Module at 20ºC. For details on the operation of the Auxiliary Battery Module, refer to the datasheet, GFK-2124. **Note:** The IC698ACC701 Lithium Battery Pack is ***not compatible*** with the CPU320.
Program storage	Up to 64 Mbytes of battery-backed RAM 64 Mbytes of non-volatile flash user memory
Power requirements	+3.3 VDC: 1.0 Amps nominal +5 VDC: 1.2 Amps nominal
Operating Temperature	0 to 60°C (32°F to 140°F)
Floating point	Yes
Boolean execution speed, typical	0.047 ms per 1000 Boolean instructions
Time of Day Clock accuracy	Maximum drift of 2 seconds per day
Elapsed Time Clock (internal timing) accuracy	0.01% maximum
Embedded communications	RS-232, RS-485
Serial Protocols supported	Modbus RTU Slave, SNP, Serial I/O
Backplane	Dual backplane bus support: RX3i PCI and high speed serial bus
PCI compatibility	System designed to be electrically compliant with PCI 2.2 standard
Program blocks	Up to 512 program blocks. Maximum size for a block is 128KB.
Memory	*%I and %Q:* 32Kbits for discrete *%AI and %AQ:* configurable up to 32Kwords *%W:* configurable up to the maximum available user RAM Symbolic: configurable up to 64 Mbytes

Note For environmental specifications and compliance to standards (for example, FCC or European Union Directives), refer to the *PACSystems RX3i System Manual,* GFK-2314.

Important installation instructions for battery

Do not connect the battery until the CPU is installed in the rack and the rack is powered on. The battery may then be attached to either of the two terminals in the battery compartment. Once that is done, the CPU may be powered down and normal battery back up operation will begin. To save battery life, do not connect the battery for the first time until the CPU is powered up.

Product Documentation

PACSystems CPU Reference Manual, GFK-2222

TCP/IP Ethernet Communications for PACSystems User's Manual, GFK-2224

TCP/IP Ethernet Communications for PACSystems Station Manager Manual, GFK-2225

C Programmer's Toolkit for PACSystems User's Manual, GFK-2259

PACSystems RX3i System Manual, GFK-2314

PACMotion Multi-axis Motion Controller User's Manual, GFK-2448

Proficy® Machine Edition Getting Started, GFK-1868

Proficy® Logic Developer, GFK-1918

Release History

Catalog Number	Firmware Version	Comments
IC695CPU320-FK	6.02	Provides capabiity for low battery detection. The new hardware is EU-ROHS compliant. For details, see "New Features and Enhancements" on page 5.
IC695CPU320-EJ	6.01	Provides for OEM protection in flash-based systems that do not use a battery. For additional problems resolved, see "Important Product Information for this Release."
IC695CPU320-EH	6.00	Adds *User Defined Types, Variable Indexed Arrays, Logic Driven Write to Flash,* and *Backplane Operations Controller Enhancement* features. See GFK-2488H for details and problems resolved.
IC695CPU320-EG	5.70	Hardware-only upgrade to enhance manufacturability. This change does not affect product features or functional compatibility.
IC695CPU320-DG	5.70	Enables support that is functionally identical to the IC695CMX128 for the IC695RMX128.
IC695CPU320-CF	5.61	Corrects the problem described in GFK-2488E.
IC695CPU320-CE	5.60	Supports the IC695PMM335 PACMotion Multi-Axis Motion Controller and other new features, and corrects the problems listed in GFK-2488E.
IC695CPU320-BD	5.51	Resolves problem with loss of CMX128 module when it is reset by the CPU320. See GFK-2448C for details.
IC695CPU320-BC	5.50	Introduced run-mode store of EGD and LREAL data type. See GFK-2448B for problems resolved.
IC695CPU320-AB	5.11	Resolved an issue with Series 90-30 Smart Modules in a main rack not transitioning to stop mode after a "Loss of Module" fault is logged. For details, see GFK-2448A.
IC695CPU320-AA	5.10	Initial release.

Important Product Information for this Release

This release provides the ability to detect low voltage levels in the backup battery for user memory. For details, see "New Features and Enhancements" on page 5.

Updates

IC695CPU320 can be field upgraded to firmware version 6.02 using the Winloader firmware upgrade utility and upgrade kit 82A1145-MS10-000-B7, which can be downloaded from http://www.ge-ip.com/support.

To use the low battery detection feature provided in the 6.02 firmware release, you will need CPU320 hardware version -Fx or later. Hardware cannot be field upgraded.

For the low battery detection circuit to function properly, an *RX3i CPU Lithium Smart Battery (IC**695**ACC302)* must be used. (Expected availability in 4th quarter, 2010)

CPU Functional Compatibility

Subject	Description
Hardware revision -Fx requires firmware release 6.02 or newer	Firmware revision 6.02 or later must be used for hardware version -Fx or higher of the CPU320. This is needed for EMC requirements. Firmware revision 6.02 is also compatible with all earlier versions of CPU320 hardware.
Programmer Version Requirements	Proficy Machine Edition Logic Developer 6.0 or later is required to use the release 6.00 features with the RX3i CPU. Proficy Machine Edition Logic Developer 5.9 SIM1 or later versions required to use the Release 5.70 features with the RX3i CPU. Proficy Machine Edition Logic Developer 5.9 is required to use the Release 5.60 features with the RX3i CPU. Proficy Machine Edition Logic Developer 5.8 is required to use Release 5.50 features with the RX3i CPU. Proficy Machine Edition Logic Developer 5.70 SIM2 Build A is required to use the Release 5.10 and 5.11 features with the RX3i.
C Toolkit Compatibility	The C Toolkit for PACSystems is distributed with Proficy Machine Edition Logic Developer. Updates can be downloaded from http://www.ge-ip.com/support. C Toolkit Release 5.00 Build 16C1 or later is required when the PACSystems CPU contains firmware Release 5.00 or later. **Note:** C blocks that were built using C Toolkit versions earlier than 5.00 Build 16C1 must be recompiled using a newer toolkit version for use with CPU firmware release 5.00 or higher. **Note:** The Series 90 Toolkit (IC641SWP709/719) is not compatible with PACSystems.
Backplanes, power supplies and system modules	As listed in the *PACSystems RX3i System Manual,* GFK-2314D or later.
Series 90-30 Expansion Rack Compatibility	The PACSystems RX3i supports Series 90-30 expansion racks, both local and remote. PACSystems RX3i CPUs do not operate in a Series 90-30 Rack. **Note:** The RUN LED on the 90-30 Power Supply located in an expansion rack (both local and remote) will ***not*** be illuminated when the RX3i System is in RUN mode and there are only input modules in the expansion rack. The RUN LED on the 90-30 Power Supply located in an expansion rack (both local and remote) ***will be*** illuminated when the RX3i System is in RUN mode and there are output modules in the expansion rack.
Series 90-30 Main Rack Compatibility	Series 90-30 Main Racks cannot be used in a PACSystems RX3i system. Series 90-30 CPUs do not operate in PACSystems RX3i Racks.
Isolated 24V power	In applications that use the IC69xALG220/221/222, consult *PACSystems RX3i Hardware and Installation Manual*, GFK-2314 for details of wiring the 24V power.
COMMREQ to PBM300	In Release 3.0, the behavior of the COMMREQ fault output on a COMMREQ sent to the PROFIBUS master module IC695PBM300 was changed to be compatible with the Series 90-30 CPU366 PROFIBUS Master. Previously, the fault output was enabled when the module received a COMMREQ and it was busy. Now, the busy condition does not result in the fault output being enabled.
Recommended IC200ALG240 revision	When a VersaMax* system Genius* Network Interface Unit (IC200GBI001) operates with a Genius Bus Controller located in a PACSystems RX3i, and the VersaMax system contains an IC200ALG240 Analog Input Module, it is recommended to update the IC200ALG240 firmware to Revision 1.10 or later. However, it is preferable to update the IC200ALG240 firmware to Revision 1.20, which contains resolutions for all issues found after Revision 1.10. Upgrade kits are available at http://www.ge-ip.com/support. Use firmware update kit 44A752313-G01 to update the IC200ALG240 firmware to Revision 1.10, or upgrade kit 44A752313-G02 to update the IC200ALG240 firmware to Revision 1.20.
Configuration of IC694MDL754	Always configure 16 bits of module status when using this module. Configuring 0 bits of module status will result in invalid data in the module's ESCP status bits.

New Features and Enhancements

Low Battery Detection

The CPU Battery Backup circuit of hardware revisions –Fx or later is modified to detect low battery conditions. The following table lists the battery voltage levels and corresponding user indications.

For the low battery detection circuit to function properly, an *RX3i CPU Lithium Smart Battery (IC**695**ACC302)* must be used. *(Expected availability in 4th quarter,* 2010*)*

Battery Voltage	***Status of Battery***	***BATTERY LED Status***
Battery Voltage >2.5V	Normal Battery	OFF
2V < Battery Voltage <2.5V	Battery Low	BLINK
Battery Voltage <2V	Battery Failed	ON

Compliance

The new hardware is European RoHS compliant.

Restrictions and Open Issues in Release 6.02

Subject	***Description***
CPU OK LED blinks and CPU communications stop after a power cycle with a battery connected and starting from RAM	Very rarely, after experiencing two consecutive rapid power cycles, the CPU may fail to start properly. When this occurs, the CPU OK LED blinks continuously (Stop-halt mode) and any communication links to the CPU will be disconnected. To recover the controller, disconnect the battery and power-cycle.
The Ethernet module fails to exchange EGD properly during power cycling	Very rarely, after experiencing multiple rapid power cycles, the CPU may fail to establish communication with one or more modules in the backplane at power up. When this occurs, several pairs of "Loss of, or missing option module" and "Reset of option module" faults will be logged in the controller fault table. If the module is an ETM, an event 30H is recorded in its station manager event log. To recover from this issue, cycle power again.

Loss of Power Supplies after firmware update	A Loss of Power Supplies after firmware update may occur. This does not happen with all firmware updates and will not occur if the system is power cycled after the firmware upgrade has completed. The following fault is displayed when this issue occurs:
	`Loss of, or missing option module`
	`Error Code 36`
	`Group 4`
	`Action 3:Fatal`
	`Task Num 9`
	`Fault Extra Data: 01 58 02 4f 80 08 0a 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00`
	To correct this condition, power cycle the system.

Battery installation	When installing a battery, when there currently is no battery installed, the battery must be installed while the CPU has power. Failing to follow this procedure could result in the CPU not powering up. If a battery is installed while power is off (and there was no battery previously installed), and the CPU fails to power up, simply remove the battery, power cycle the CPU and then install the battery.

Subject	Description
Hot Swapping some analog modules slowly may result in modules not being recognized	Occasionally during a hot insertion (hot swap) of IC695 Non-Isolated Analog Input Modules, input channels may take up to 2 seconds to reflect actual input values after the module OK bit is enabled in the module status word. This delay has only occurred when the hot insertion has been done slowly (i.e. approximately 1.5 seconds to insert the module)
Ethernet disconnect during Word-for-Word change.	If the Ethernet connection is broken during a word-for-word change, the programmer may not allow a subsequent word-for-word change after reconnecting due to the fact that it thinks another programmer is currently attached. If this occurs, you should go offline and then back online again.
Simultaneous Clears, Loads and Stores not supported.	Currently, PACSystems CPUs do not support multiple programmers changing CPU contents at the same time. The programming software may generate an error during the operation. Simultaneous loads from a single CPU are allowed.
Hardware configuration Not Equal after changing target name.	If you store a hardware configuration to flash that sets “Logic/Config Power up Source” to “Always Flash” or “Conditional Flash” and then subsequently changes the name of the target in the programming software, the hardware configuration will go Not Equal and will not Verify as equal.
Controller and IO Fault Tables may need to be cleared twice to clear faulted state.	Both Controller and IO fault tables may need to be cleared to take the CPU out of Stop/Fault mode. If one of the tables contains a recurring fault, the order in which the tables are cleared may be significant. If the CPU is still in Stop/Fault mode after both tables are cleared, try clearing the fault tables again.
Setting Force On/Off by storing initial value.	Once a force on or force off has been stored to the controller, you cannot switch from force on to force off or vice-versa directly by downloading initial values. To turn off the force on or off, download the project.
Number of active programs returned as zero.	The SNP request Return Controller Type and ID currently returns the number of active programs as zero.
Serial I/O fails at 115K during heavy interrupt load	Rare data corruption errors have been seen on serial communications when running at 115K under heavy interrupt load on the controller. Under heavy load applications, users should restrict serial communications to 57K or lower.
SNP ID not always provided	Unlike the Series 90-30, the RX3i CPU’s SNP ID does not appear in the Machine Edition programmer Show Status display. Service Request 11 will always return zeros.
Second programmer can change logic while in Test & Edit mode	While currently active in a Test and Edit session using Machine Edition on one PC, Machine Edition running on another PC is not prevented from storing new logic to the controller.
Must have logic if powering-up from flash	If the application will configure the CPU to retrieve the contents of flash memory at power-up, be sure to include logic along with hardware configuration when saving to flash memory.
CPU may not detect low-battery condition	A battery with very low capacity may still have a terminal voltage high enough to report that it is a good battery. In this case, when the battery starts supplying the memory power (battery backup), the battery voltage quickly drops to unacceptable levels, with little warning to the user before failure.To insure against data loss, users should replace batteries in accordance with the guidelines provided in the CPU Reference Manual, GFK-2222. Additionally, users could save logic and hardware configuration to flash.
Two loss of module faults for Universal Analog Module	Occasionally, the hot removal of the Universal Analog Input Module (IC695ALG600) results in two “Loss of I/O Module” faults instead of one.
Power up of Series 90-30 HSC module may take as long as 20 seconds	As power is applied to a 90-30 High-Speed Counter, the "module ready" bit in the status bits returned each sweep from the module may not be set for as long as 20 seconds after the first controller sweep, even though there is no Loss of Module indication. I/O data exchanged with the module is not meaningful until this bit is set by the module. For details, see “Data Transfer Between High Speed Counter and CPU” in the *Series 90-30 High Speed Counter User’s Manua*l, GFK-0293C.

Subject	*Description*
Informational fault at power up	Intermittently during power-up, an Informational non-critical CPU software fault may be generated with fault extra data of 01 91 01 D6. This fault will have no effect on the normal operation of the controller. But, if the hardware watchdog timer expires after this fault and before power has been cycled again, then the outputs of I/O modules may hold their last state, rather than defaulting to zero.
Extended memory types for IO triggers	%R, %W and %M cannot be used as IO triggers.
Possible Machine Edition inability to connect	Infrequently, an attempt to connect a programmer to an RX3i via Ethernet will be unsuccessful. The normal connection retry dialog will not be displayed. Rebooting the computer that is running the programmer will resolve the behavior.
SNP Update Datagram message	If an Update Datagram message requests 6 or less bits or bytes of data, the controlleri will return a Completion Ack message without Text Buffer. The protocol specifies that the returned data will be in the Completion Ack message, but it may not be.
GBC30 may not resume operation after power cycle	In rare instances, a GBC30 in an expansion rack may not resume normal operation after a power cycle of either the expansion rack or the main rack. To restore GBC operation, power cycle the rack again.
Configuration of third-party modules	Do not specify a length of 0 in the configuration of a third-party module. The module will not work properly in the system.
Power supply status after CPU firmware update	The controller will report a Loss of or Missing Option Module fault for the IC695PSD140 RX3i power supply following an update of CPU firmware. Also, the slot will appear empty in the programmer's online status detail view. The power supply continues to operate normally. Power cycle to restore normal status reporting.
Power supply status after power cycling	Rarely, turning a power supply on or off may not result in an Add or Loss fault. Also, the slot will appear empty in the programmer's online status detail view. The power supply continues to operate normally. Power cycle to restore normal status reporting.
Don't use multiple targets	In a system in which the hardware configuration is stored from one target and logic is stored from a different target, powering-up from flash will not work. The observed behavior is that, following a power up from flash, Machine Edition reports hardware configuration and logic "not equal".
Missing Loss of Terminal Block fault.	The IC695ALG600/608/616 analog input modules do not produce a Loss of Terminal Block fault when hardware configuration is stored or the module is hot-inserted, and the terminal block is not locked into place.
Sequence Store failure.	When downloading projects with very large hardware configurations or which use large amounts of user memory, it is possible to encounter a controller Sequence Store Failure error when writing the configuration to flash. To work around this error, either or both of the following actions may be helpful: 1. Perform an explicit clear of flash prior to performing the write. 2. Increase the operation timeout used by Machine Edition prior to performing the write. This is done by expanding the Additional Configuration in the Inspector window for the target controller, and adjusting the Request Timeout. The timeout may need to be increased to as much as 60,000 msec, depending on the amount of memory used and the condition of the flash memory.
IC694MDL754: Must configure module status bits	Always configure 16 bits of module status when using this module. Configuring 0 bits of module status will result in invalid data in the module's ESCP status bits.
IC695ALG600 Lead Resistance Compensation setting	A configuration store operation will fail if a channel is configured for 3-wire RTD and Lead Resistance Compensation is set to Disabled. A Loss of Module fault will be logged in the I/O Fault table at the end of the store operation. To recover the lost module, the configuration must be changed to enable Lead Resistance Compensation and module must be power cycled.

Subject	Description
C Toolkit PlcMemCopy Documentation Incorrect	This routine does allow the destination and source pointers to be outside of reference memory. If the destination points to discrete reference memory, overrides and transitions will be honored. Note that the header for PlcMemCopy has been updated in Release 3.50 of the C toolkit.
WinLoader may stop operating	On computers running Windows 2000 and using some versions of Symantec Antivirus protection, WinLoader will fail if used in advanced mode. Recovery requires cycling the computer's power.
Logic and HWC not equal after power cycle	If the Hardware Configuration from Target 1, with Logic/Configuration Power-up Source and Data Source both set to “Always from Flash,” is stored in Flash, then Logic and Hardware Config from Target 2, with Logic/Configuration Power-up Source both set to “Always from RAM,” is stored to RAM and there is a good battery, then when power is cycled the programmer may show that Logic and Hardware Config are not equal. The remedy is to clear Flash and then store the Logic and Hardware Config from Target 2.
WinLoader does not detect PC COM port in use when upgrading PACSystems CPU.	WinLoader does not detect if a PC's COM port is in use when attempting to connect to a PACSystems CPU to perform a firmware upgrade. If the port is already in use it displays the status "trying to connect" followed by "waiting for target." To proceed with the upgrade, press the "abort" button and disconnect the other application that is using the COM port.
CPU320, CRU320 user application and values cleared after power cycle	Under rare circumstances during multiple rapid power cycles the CPU320/CRU320 will power up with the user application and data in RAM cleared. There will be a “Corrupted user memory” fault in the controller fault table (Group 130, Error code 1). This will not occur if the user application and data are loaded from flash on power-up (“Always Flash” or “Conditional Flash”).
WinLoader does not display error when it can't connect serially with PACS CPU.	WinLoader does not display an error message if it cannot connect to the PACS CPU when attempting to connect to a PACSystems CPU to perform a firmware upgrade. This occurs if the cable is physically not connected to the CPU or if the CPU's serial port is not configured for the same baud as WinLoader. In this case Winloader displays the status "trying to connect" followed by "waiting for target." To proceed with the upgrade, press the "abort" button and correct the cable or baud rate setting.

Operational Notes

Subject	*Description*
Block name now provided in User Application faults	In firmware versions earlier than 6.01, the fault entry for a non-fatal application fault (for example, reference-out-of-range) provided numeric information to identify the logic block causing the error. However, the user did not have a way to correlate the numeric information with the name of the block. Firmware versions 6.01 and later include the first 12 characters of the block name in the fault entry.
RUN LED is not illuminated on the Series 90-30 power supply for an RX3i remote/expansion rack with input modules only	When a remote or expansion baseplate is used with the RX3i, the RUN LED on the Series 90-30 power supply for that baseplate is illuminated when the system is in Run mode only if the rack contains at least one output module. If the rack contains input modules only, the RUN LED is not illuminated. This is due to the way input modules are managed in the PACSystems design and does not indicate an error.
Undefined symbols in C blocks	In Release 5.00 or later, if an attempt is made to download a C block containing undefined symbols, the download will fail. Machine Edition will display the following message in the Feedback Zone: Error 8097: Controller Error – Controller aborted the request [0x05][0xFF] Prior to Release 5.00, C blocks containing undefined symbols could be successfully downloaded, but if they were executed the CPU would transition to Stop/Halt mode. For details, see “C Toolkit Compatibility” on page 4.
Length of serial I/O buffer	(Release 5.0 or later) The "Set Up Input Buffer Function" always allocates a buffer containing 2049 bytes. This is one byte more than previous PACSystems releases.
Changing IP address of Ethernet interface while connected	Storing a hardware configuration with a new IP address to the RX3i while connected via Ethernet will succeed, then immediately disconnect because the RX3i is now using a different IP address than the Programmer. You must enter a new IP address in the Target Properties in the Machine Edition Inspector window before reconnecting.
Duplicate station address for Modbus will conflict with other nodes	The default serial protocol for the RX3i is Modbus RTU. The default Station Address is 1. If the RX3i is added to a multi-drop network, care must be taken that the RX3i is configured with a unique Station Address. Nodes with duplicate Station Addresses on the same network will not work correctly.
Timer operation	Care should be taken when timers (ONDTR, TMR, and OFDTR) are used in program blocks that are NOT called every sweep. The timers accumulate time across calls to the sub-block unless they are reset. This means that they function like timers operating in a program with a much slower sweep than the timers in the main program block. For program blocks that are inactive for large periods of time, the timers should be programmed in such a manner as to account for this catch up feature. Related to this are timers that are skipped because of the use of the JUMP instruction. Timers that are skipped will NOT catch up and will therefore not accumulate time in the same manner as if they were executed every sweep.
Constant Sweep	Constant Sweep time, when used, should be set at least 10 milliseconds greater than the normal sweep time to avoid any over-sweep conditions when monitoring or performing on-line changes with the programmer. Window completion faults will occur if the constant sweep setting is not high enough.
Large number of COMMREQs sent to module in one sweep causes faults	A large number of COMMREQs (typically greater than 8) sent to a given board in the same sweep may cause Module Software faults to be logged in the RX3i fault table. The fault group is MOD_OTHR_SOFTWR (16t, 10h) and the error code is COMMREQ_MB_FULL_START (2). When this occurs, the “FT” output of the function block will also be set. To prevent this situation, COMMREQs issued to a given board should be spread across multiple sweeps so that only a limited number (typically 8 or less) of COMMREQs are sent to a given board in each sweep. In addition, the FT output parameter should be checked for errors. If the FT output is set (meaning an error has been detected), the COMM_REQ could be re-issued by the application logic.

Subject	Description
C Block standard math functions do not set errno	In C Blocks, standard math functions (e.g. sqrt, pow, asin, acos) do not set errno to the correct value and do not return the correct value if an invalid input is provided.
Upgrading firmware	The process of upgrading the CPU firmware with the WinLoader utility may fail when multiple IO modules are in the main rack, due to the time it takes to power cycle the rack system. If the upgrade process fails, move the CPU to a rack without IO modules and restart the upgrade process. Winloader initial connect baud rate is fixed at 19200 baud. Note that the firmware download will occur at 115.2K baud by default. Note that if you have hyperterm open on a port, and then try to use Winloader on the same port, Winloader will often say "Waiting for Target" until the hyperterm session is closed.
Hot swap	Hot Swap of power supplies or CPUs is not supported.
Serial port configuration COMMREQs	With the following combination of circumstances, it is possible to render serial communications with the CPU impossible: User configuration disables the Run/Stop switch User configures the power up mode to Run or Last Logic is stored in FLASH and user configures CPU to load from FLASH on power up User application issues COMMREQs that set the protocol on both of the serial ports to something that does not permit communications to the Machine Edition programmer.
Incorrect COMMREQ status for invalid program name	The program name for PACSystems is always "LDPROG1". When another program name is used in a COMM_REQ accessing %L memory, an Invalid Block Name (05D5) error is generated.
FANUC I/O Master and Slave operation	Scan sets on the master do not work properly for the first operation of the scan set after entering RUN mode. They do work properly for subsequent scans. After downloading a new hardware configuration and logic, a power cycle may be required to resume FANUC I/O operation. Use controllers of similar performance in FANUC I/O networks. If a master or slave is located in an RX3i system, the other controllers should be RX3i or Series 90-30 CPU374. Repeated power up/down cycles of an expansion rack containing FANUC I/O slaves may result in failure of the slaves' operation, with the RDY LED off.
Lost count at power up for Serial IO Processor	The serial IO Processor (IC693APU305) will lose the first count after every power up or every time the module receives a configuration.
COMMREQ status words declared in bit memory types must be byte-aligned	In previous releases, the CPU allowed configuration of COMMREQ Status Words in bit memory types on a non-byte-aligned boundary. Even though the given reference was not byte-aligned, the firmware would adjust it the next-lowest byte boundary before updating status bits, overwriting the bits between the alignment boundary and specified location. To ensure that the application operates as expected, release 3.50 requires configuration of COMMREQ Status Words in bit memory types to be byte-aligned. For example if the user specified status bit location of %I3, the CPU aligns the status bit location at %I1. Release 3.50 firmware requires the user to specify the appropriate aligned address (%I1) to ensure that the utilized location is appropriate for their application. Note that the actual reference location utilized is not changed, but now is explicitly stated for the user.

Subject	*Description*
STOP and RUN mode transition priority	The PACSystems CPU receives requests to change between stop and run mode from many different sources. These include (but are not limited to) Proficy Machine Edition, HMIs, the user application, and the RUN/STOP switch. Since there are many potential sources for a mode change request, it is possible to receive a new mode change request while another is already in progress. When this occurs, the CPU evaluates the priority of the new mode change request with the mode change that is in progress. If the new mode change request has an equal or higher priority than the one already in progress, the CPU transitions to the new mode instead of the one in progress. If, however, the new mode change request has a lower priority than the one in progress, the new mode request is discarded and the CPU completes the mode change that is in progress. The sweep mode priorities are (listed from highest to lowest priority): STOP HALT, STOP FAULT, STOP, and RUN. (Note: The IO ENABLED/DISABLED state is not part of the mode priority evaluation.) For example, a CPU is in RUN IO ENABLED mode and a Service Request 13 function block is executed to place the CPU into STOP IO DISABLED mode. Before the transition to STOP IO DISABLED is completed, the RUN/STOP switch is changed from RUN IO ENABLED to RUN IO DISABLED. In this case, the CPU ignores the new request from the RUN/STOP switch to go to RUN IO DISABLED mode because it is already processing a request to go to STOP IO DISABLED mode and STOP mode has a higher priority than RUN mode.
Suspend IO Function Block does not Suspend EGD	In a Series 90-70 the SUSPEND_IO function block suspends EGD in addition to IO Scan. In PACSystems controllers the SUSPEND IO only suspends IO Scan.

Installation in Hazardous Locations

The following information is for products bearing the UL marking for Hazardous Locations:

- WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;
- WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND
- WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS LOCATIONS ONLY
- The tightening torque range for the control terminals is 9.6-11.5 in. lb. Use only wire rated for 90°C. Be sure to observe any additional ratings that are provided with the modules.